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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/552,383

04/19/2000

Stephen L. Willis

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7590

10/20/2004

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EXAMINER

DIAZ, JOSE R

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 10/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/552,383	Applicant(s) WILLIS, STEPHEN L.	
	Examiner José R. Díaz	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 July 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 30-37 and 56-62 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 30-37 and 56-62 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 30-37 and 56-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US Pat. No. 6,160,314) in view of Sandhu et al. (US Pat. No. 5,069,002).

Regarding claims 30-32, 34 and 56-58, Lee et al. teaches a method of forming a dielectric layer of a first thickness on a semiconductor wafer comprising:

forming the dielectric layer (202) of the first thickness on the wafer (200) (see fig. 2B);

positioning a shield layer (206) formed of a material different than the dielectric layer on the dielectric layer (see fig. 2B);

positioning a sacrificial layer (208) on the shield layer (see fig. 2B);

forming an aperture (214) in the sacrificial layer, shield layer, and dielectric layer (see fig. 2B);

depositing conductive material (216) so as to fill the aperture and so as to cover at least a portion of the sacrificial layer (see fig. 2B);

removing the conductive material and the sacrificial layer using a chemical mechanical polishing process (see fig. 2C) adapted to remove the conductive material

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and the sacrificial layer until the shield layer is reached. Please note that it has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison* 69 USPQ 138 (CCPA 1946).

wherein the shield layer (206) is more resistant to planarization by the chemical mechanical polishing process than the sacrificial layer (see col. 3, lines 11-14 and fig. 2C, which shows the shield layer 206 after the CMP), and

wherein the shield layer inhibits thinning of the dielectric layer during the chemical mechanical polishing process (see col. 3, lines 12-14), and

wherein interposing the sacrificial layer (208) between the conductive material (216) and the shield layer (206) reduces the amount of conductive material on the shield layer following the chemical mechanical polishing process (see fig. 2C, which shows the remaining conductive layer adjacent to a sidewall of the shield layer 206); and

halting the chemical mechanical polishing process when the sacrificial layer (208) has been removed (see fig. 2C).

However, Lee et al. is silent with respect to the limitation of detecting when the CMP process has removed the sacrificial layer. Sandhu et al. teach that is well known in the art to perform a sensing step during the CMP process, in which the change in friction is detected by rotating the wafer and polishing surfaces with electric motors and measuring current changes on one or both of the motors (see abstract and col. 3, lines 38-41 and 55-63 and col. 4, lines 28-30).

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Lee et al. and Sandhu et al. are analogous art because they are from the same field of endeavor as applicant's invention. At the time of the invention it would have been obvious to a person of ordinary skill in the art to include the step of detecting when the chemical mechanical polishing process has removed the sacrificial layer by detecting when the CMP process has reached the shield layer and halting the chemical mechanical polishing process upon detecting when the sacrificial layer has been removed and prior to the complete removal of the shield layer so as to maintain the dielectric layer at the first thickness. The motivation for doing so, as is taught by Sandhu et al., is providing a control means for adjusting or stopping the process (abstract). Therefore, it would have been obvious to combine Sandhu et al. with Lee et al. to obtain the invention of claims 30-37 and 56-62.

Regarding claims 33, 35-36 and 59-61, Lee et al. teaches forming the dielectric layer and the sacrificial layer of an oxide material and the shield layer of an oxynitride material, e.g. dielectric antireflective coating (col. 2, lines 47-62). With regards to the claimed BPSG material, it is noted that BPSG is a very well known interdielectric material use for isolating multilevel structure. The court has held that it is within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416 (CCPA 1960).

Regarding claims 37 and 62, Lee et al. further teaches forming a cavity (212) in the dielectric layer (202) and wherein depositing the conductive material (216) on the

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sacrificial layer (208) results in the cavity being filled with the conductive material (see fig. 2B).

### ***Response to Arguments***

3. Applicant's arguments with respect to claims 30-37 and 56-62 have been considered but are moot in view of the new ground of rejection.

### ***Conclusion***

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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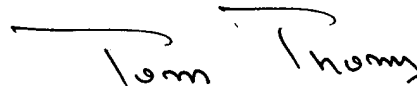
***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R. Díaz whose telephone number is (571) 272-1727. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JRD  
10/18/04

A handwritten signature in black ink that reads "Tom Thomas". The signature is written in a cursive style with a horizontal line above the first name.

TOM THOMAS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800